

REMARKS

Claims 51-61 are presented for consideration in lieu of claims 27-50, which have been canceled without prejudice or disclaimer. Claim 51 is the sole independent claim.

Support for the new claims can be found, for example, beginning on page 13, line 10, of the specification.

The previously presented claims, *i.e.*, claims 27-50, were rejected under 35 U.S.C. § 103 as allegedly being obvious over Nishi '195 in view of Matsuura '795 and Inoue '898. Without conceding the propriety of this rejection, claims 27-50 have been canceled. This rejection is therefore deemed to be moot and should be withdrawn. Further, it is submitted that new claims 51-61 are patentable over the applied art.

Claim 51 of Applicant's invention relates to an exposure apparatus for exposing a wafer to light, and comprises a movable stage configured to hold the wafer, a scope having an image sensor and configured to obtain image data by accumulating image signals corresponding to an image of a mark formed on the image sensor during an accumulation period of the image sensor, with the mark being held by the stage, and a stage position measurement system configured to measure a position of a stage a plurality of times during the accumulation period of the image sensor. In addition, a controller is configured to calculate an average position of the plurality of positions of the stage measured during the accumulation period, to calculate a position of the mark based on the image data obtained by the scope and data of the average position, and to control a position of the stage based on the calculated position of the mark.

In accordance with Applicant's claimed invention, a high performance exposure apparatus can be provided.

The primary citation to Nishi relates to a projection exposure apparatus and is relied upon for teaching two image sensing systems as a first measurement system, an off-axis alignment system, and a plurality of interferometric systems for measuring a reticle stage at a plurality of points and a wafer stage at a plurality of points.

The secondary citation to Matsuura is directed to an alignment apparatus and is relied upon for continuously measuring a stage position with interferometric systems, which is not disclosed in Nishi.

The newly cited patent to Inoue relates to an alignment illumination system and is relied upon for its teaching of determining mark position data via stage position data and image data. In Inoue, an imaging element S1 images an alignment mark WM1 on a substrate W, and a position detecting system 107 reads a position of a substrate stage 105 (see FIG. 4).

Without conceding the propriety of combining the art in the manner proposed in the Office Action, it is submitted that such a combination still fails to teach or suggest Applicant's claimed invention. For example, the proposed combination of art fails to teach or suggest, among other features, a controller configured to calculate an average position of the plurality of positions of the stage measured during the accumulation period and to calculate a position of the mark based on the image data and the average position data. The position of the stage is controlled based on the calculated position of the mark.

In Nishi, an averaged position of each of detected positions (pixel positions) of plural line patterns arranged in the X-direction is defined as the X-directional position of a fiducial mark FM (with the Y-directional position calculated in the same manner) (see col. 16, lines 8-19). This differs considerably, however, from calculating the average position of a plurality of positions of a stage measured during an accumulation period of the image sensor, as set forth in Applicant's claim 51.

According, it is submitted that Applicant's invention as set forth in claim 51 is patentable over the cited art. In addition, dependent claims 52-61 set forth additional features of Applicant's invention. Independent consideration of the dependent claims is respectfully requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Scott D. Malpede", is written over a horizontal line.

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